REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested.

Claim Rejections – 35 USC § 102

The Office Action rejected claims 1-9, 13, 17, 20-29, 45 and 30-40 under 35 .U.S.C. 102 (b) as being anticipated by Dobbins et al. in United States Patent No. 5,825,772.

Dobbins et al. teach a method and apparatus for providing connection-oriented services for packet switch data communications networks. Directory services include distributed discovery of MAC addresses and protocol alias addresses. Topology services include a link state topology exchange among switches, which provides each switch with a complete topology graph of the network. This enables an access switch receiving a data packet to determine a complete path from a source end system to a destination end system.

Dobbins et al. therefore teach a version of OSPF described in the background of the invention. As taught on page 1, line 17 – page 2, line 11 of the instant application:

> Routers use link-state algorithms to send routing information to all nodes in an IP network by calculating the shortest path to each node based on a topography of the IP network constructed by each node. Each router maintains a routing table in which the router stores routes to particular network destinations. Each router sends the state of its own links to other routers in the IP network.
>
> The advantage of shortest path first algorithms, compared to distance vector algorithms, is that they result in smaller more frequent updates everywhere in the IP network. They also converge

quickly, so that problems such as routing loops and infinite counts, in which routers continuously increment the hop count to a particular destination node, are avoided.

A disadvantage of OSPF algorithms is that they require a great deal of processing power and memory in the OSPF routers. However, it is generally believed that the advantages outweigh the disadvantages, and OSPF Version 2, which is defined by RFC 1583, appears to be rapidly replacing Reservation Initiation Protocol (RIP) on IP networks.

As further explained on page 2, lines 12-20 of the instant application, current OSPF link-state routing protocols flood Link-State Advertisements (LSAs) to all OSPF routers. This provides OSPF routers with routing information for routing payload packets on a hop-by-hop basis. However, for the purposes of establishing paths for Traffic Engineering (TE), TE routing information is only required at a point where the path setup is triggered. Consequently, it is not necessary for all routers in a routing area to flood, process and store a large number of TE-LSAs.

Claim 1 claims a method of establishing explicit constrained edge-to-edge paths in one of an Internet Protocol (IP), MPLS and Optical network that uses a <u>modified</u> open shortest path first (OSPF) routing protocol for constraint route distribution and path computation, the method comprises steps of: a) sending traffic engineering link state advertisement (TE-LSA) messages from OSPF routers in the network to a nearest one of at least one traffic engineering route exchange router (TE-X) in the network, to permit each of the at least one TE-X to maintain a traffic engineering link-state database (TE-LSDB); and b) querying the nearest one of the at least one TE-X to obtain an explicit edge-to-edge path satisfying specified traffic engineering (TE) constraints.

It is established law that in order to anticipate, a reference must teach every aspect of the claimed invention. Dobbins et al. fail to anticipate claim 1 for at least the following reasons:

1) Dobbins et al. fail to teach or suggest sending traffic engineering link state advertisement (TE-LSA) messages;
2) Dobbins et al. fail to teach or suggest traffic engineering route exchange routers (TE-X) in the network;
3) Dobbins et al. fail to teach or suggest TE-Xs that maintain a traffic engineering link-state database (TE-LSDB); and
4) Dobbins et al. fail to teach or suggest querying a nearest one of at least one TE-X to obtain an explicit edge-to-edge path satisfying specified traffic engineering (TE) constraints.

It is therefore respectfully submitted that Dobbins et al., which teach that the switches in their network run a distributed link state protocol (column 3, line 43) and that the protocol provides a fully-connected mesh topology (called a directed graph) that is distributed in each switch (column 3, lines 43-46), fail to teach or suggest the claimed invention.

It is therefore respectfully submitted that for at least the reasons set forth above, Dobbins et al. fail to teach the invention claimed in claim 1 and the rejection of claims 1-9 and 13 is traversed.

With respect to claim 17, claim 17 claims a traffic engineering route exchange router (TE-X) in a network that uses an open shortest path first (OSPF) routing protocol, comprising: a) a traffic engineering link-state database (TE-LSDB compiled using traffic engineering link-state advertisement (TE-LSA) messages received from OSPF routers in the network; and b) a messaging system for exchanging TE-LSA messages with peer TE-Xs in the network.

For reasons set forth above with respect to claim 1, Dobbins et al. fail to teach at least the following claimed in claim 17:

1) a traffic engineering route exchange router (TE-X);
2) a traffic engineering link-state database (TE-LSDB) compiled using traffic engineering link-state advertisement (TE-LSA) messages received from OSPF routers in the network; and
3) a messaging system for exchanging TE-LSA messages with peer TE-Xs in the network.

Dobbins et al. teach that each access switch performs the connection management for calls it is originating (column 4, lines 21-23). Consequently, Dobbins et al. teach directly away from the traffic engineering route exchange router in the network claimed in claims 17, 20-29 and 45. The rejection of those claims is thereby traversed.

With respect to claim 30, claim 30 claims a method of reducing traffic engineering messaging loads in an OSPF network, comprising steps of: a) configuring at least one OSPF router in the OSPF network as a traffic engineering route exchange router (TE-X); b) enabling the at least one TE-X to advertise to other OSPF routers in the network to permit the other OSPF routers to distribute traffic engineering link-state advertisement (TE-LSA) messages to at least one TE-X; and c) enabling the other OSPF routers in the network to send the TE-LSA messages directly to a nearest one of the at least one TE-X, and to query the nearest one of the at least one TE-X for an explicit route to an edge router in the network.

Dobbins et al. fail to teach or suggest at least the following:

1) configuring an OSPF router in the network as a traffic engineering route exchange router (TE-X);
2) a TE-X that advertises to other OSPF routers in the network;
3) OSPF routers that send traffic engineering link state advertisement messages to traffic engineering route exchange routers;

4) sending TE-LSA messages directly from an OSPF router to a nearest TE-X; and

5) querying the nearest TE-X for an explicit route to an edge router in the network.

For at least the reasons set forth above, Dobbins et al. fail to disclose the invention claimed in claim 30 and the rejection of claims 30-37 is traversed.

Claim 38 claims a data network that uses an open shortest path first (OSPF) routing protocol, comprising: a) a plurality of OSPF routers, at least one of the OSPF routers being adapted to function as a traffic engineering route exchange router (TE-X); and b) a remainder of the routers being adapted to send traffic engineering link-state advertisement (TE-LSA) messages directly to a one of the at least one TE-X, to enable the one TE-X to maintain a traffic engineering link-state database (TE-LSDB) for computing explicit routes between edge routers in the data network.

Claim 38 has been amended to correct a typographical error in line 9 in which "on" should have read --of--; and the word "one" was missing before the term "TE-X".

For reasons explained above in detail, Dobbins et al. fail to teach or suggest at least the following:

1) an OSPF router adapted to function as a traffic engineering route exchange router;

2) a network in which OSPF routers are adapted to send traffic engineering link-state advertisement messages directly to the traffic engineering route exchange router; and

3) a traffic engineering route exchange router that maintains a traffic engineering link-state database (TE-LSDB) for computing explicit routes between edge router in the data network.

Consequently, the rejection of claims 38-40 is traversed.

Claim Rejections – 35 USC § 103

The Office Action rejected claim 10-12 under 35 U.S.C. 103(a) as being unpatentable over Dobbins et al. in view of Crawley et al. in United States Patent No. 5,995,503.

For reasons set forth above in detail, Dobbins et al. fail to teach or suggest the invention claimed in claim 1 from which claims 10-12 depend.

In any case, Crawley et al. teach a system for providing quality of service routing functions in a connectionless network having multiple nodes. The system generates a link resource advertisement for each node in the network. Each link resource advertisement includes information regarding link resources available on a particular node in the network. The system also generates resource reservation advertisements for each node in the network. Each resource reservation advertisement includes information regarding a particular node's current reservation for a data flow. Network paths are calculated in response to a quality of service request. The calculations are performed based on information contained in the link resource advertisements and resource reservation advertisements. Thus, Crawley et al. teach extending QoS to OSPF (column 4, lines 55-63). Consequently, the resource reservation advertisements are **broadcast** to all other nodes in the network (column 5, lines 14-19).

Crawley et al. therefore likewise teach away from the invention claimed in claims 10-12, because Crawley et al. broadcast advertisements to all other nodes in the network. The rejection of claims 10-12 is thereby traversed.

The Office Action rejected claims 14-16 under 35 U.S.C. 103(a) as being unpatentable over Dobbins et al in view of Casey et al. in United States Patent No. 6, 205,488.

Casey et al. teach a virtual private network that enables private communications between two or more private networks over a shared MPLS

network. The virtual private network includes multiple routers connected to the shared MPLS network and configured to dynamically distribute VPN information across the shared MPLS network. The VPN information includes a VPN identifier assigned to that route, which identifies a VPN with which the router is associated. The router includes a first table that stores a map of the label switched paths from the router in question to all other routers connected to the shared MPLS network. The router also includes a second table that stores a map of label switched paths from the router in question to all other routers connected to the shared MPLS network which share a common VPN identifier.

Casey et al. fail to teach or suggest traffic engineering LSAs. And, for reasons set forth above, no combination of Dobbins et al. and Casey et al. teaches or suggests the invention claimed in claims 14-16, which depend from claims 13 and 1. The rejection of claims 14-16 is thereby traversed.

The Office Action rejected claims 18-19 and 41-44 under 35 U.S.C. 103(a) as being unpatentable in view of Dobbins et al. and Tappan in United States Patent No. 6,473,421.

Tappan teaches a communications-networking autonomous system consisting of an OSPF domain, autonomous-system border routers that cause exchange of hierarchical forwarding labels whose hierarchies are based on OSPF areas. A border router transmits into the domain an OSPF LSA Update message containing an AS-External LSA whose External Route Tag field other routers interpret as specifying a label to be used for forwarding. When that OSA is flooded into the OSPF domain, area border routers respond by flooding new LSAs created from the received one by replacing the label contained in the External Route Tag field with labels that specify the forwarding tables' locations containing information for forwarding to the originating autonomous system border router.

It is therefore clear that Tappan, like Dobbins et al., Crawley et al., and Casey et al., teaches the flooding of messages to every node in the network.

This teaches directly away from the invention claimed in claims 18, 19 and 41-44. The rejection of those claims is thereby traversed.

Claims 21, 23, 25, 36 and 42 have been amended to correct minor typographical errors identified in the listing of the claims above.

For reasons set forth above in detail, and in view of the above-noted claim amendments, all claims pending in this application are considered to be in a condition for immediate allowance. Favourable reconsideration and early issuance of a Notice of Allowance are therefore requested.

Respectfully submitted,
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